

Report Summary

Final Hells Canyon Environmental Investigation

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INTRODUCTION

The Northwest Electric Power Planning and Conservation Act of 1980 provided for the establishment of a Regional Power Planning Council (Regional Council) and mandated the development of a Columbia River Basin Fish and Wildlife Program (F&W Program). The F&W Program was adopted by the Regional Council in November 1982, and is intended to mitigate fish and wildlife losses resulting from the development of hydroelectric dams on the Columbia and Snake Rivers. One element of the F&W Program is the Water Budget. It calls for additional flows in the Columbia and Snake Rivers between April 15 and June 15 to improve the survival of juvenile salmon and steelhead migrating downstream. The Snake River's contribution to the Water Budget is 20,000 cubic feet per second-months* over and above water that would normally flow for power production.

The water for the Water Budget would come out of Idaho Power Company's (IPCo) Hells Canyon Complex and the Corps of Engineers' (Corps) Dworshak Reservoir. IPCo's Hells Canyon Complex consists of three dams, Brownlee, Oxbow, and Hells Canyon. Brownlee, at the upstream end, contains a large reservoir and controls flow to the lower dams.

IPCo's participation in the Water Budget could affect the level of the Brownlee Reservoir and flows downstream of the Hells Canyon Complex on the Snake River. In light of this, Bonneville Power Administration (BPA) and IPCo contracted with the consulting firm of CH2M Hill to study the potential

* A volume of water equal to a flow of 20,000 cubic feet per second, 24 hours per day, for a period of a month.

changes that could occur to the environment. The Environmental Investigation (EI) takes into account concerns that were expressed by the public at a series of public meetings held in the Snake River area during June 1983 and again during September 1984. Existing information and consultations with agencies which have management responsibilities in the project area formed the basis for the data used in the EI.

This document summarizes the findings of the final EI in the following areas:

- (1) natural features, water use, and air and water quality;
- (2) fish, wildlife, and vegetation;
- (3) land use, recreation, and aesthetics; and
- (4) historical and archaeological resources.

The EI provides information to be used by IPCo as they assess the effect on the system operations (power and nonpower) resulting from Water Budget participation. BPA and IPCo are continuing to discuss the prospects for IPCo's involvement in implementation of the Water Budget on the Snake River. When IPCo reaches a decision on whether and to what extent it wishes to participate in a Water Budget agreement with BPA, the proposed agreement will be subject to analysis under the National Environmental Policy Act (NEPA). That analysis will consider alternatives, significance of impacts to the environment, and mitigative measures.

THE HELLS CANYON COMPLEX ENVIRONMENTAL INVESTIGATION

Meetings held in June 1983 helped to determine the focus of the EI. The area studied extends along the Snake River from the upper end of the Brownlee reservoir to the upper end of the Lower Granite reservoir. Figure 1 shows the study area subdivided into a river section, or reach (downstream of Hells Canyon Dam), and a reservoir reach (upstream of Hells Canyon Dam).

The EI evaluates three Water Budget scenarios, or levels of flow, developed by IPCo. The scenarios involved drawing down Brownlee Reservoir to three different elevations or floor levels (2065 ft., 2050 ft., and 2036 ft.) for Water Budget flows. Brownlee is full at 2077 ft. The models or studies used to examine each of the scenarios were based on the following assumptions: existing constraints on IPCo's Brownlee operations (particularly flood control); additional water drafted from Brownlee Reservoir only during the month of May; and reduced flows out of Brownlee to the minimum permitted under the Federal Energy Regulatory Commission license during the months of June and July in order to permit refill of the reservoir.

These studies were designed so that only the months of May, June, and July would be affected. For purposes of analysis, the month of May was separated into two halves or two distinct flow periods.

The analysis of the Water Budget scenarios showed that reservoir elevations and river flows would change from present conditions only in their timing and duration, but would never exceed historical extremes. During years of low

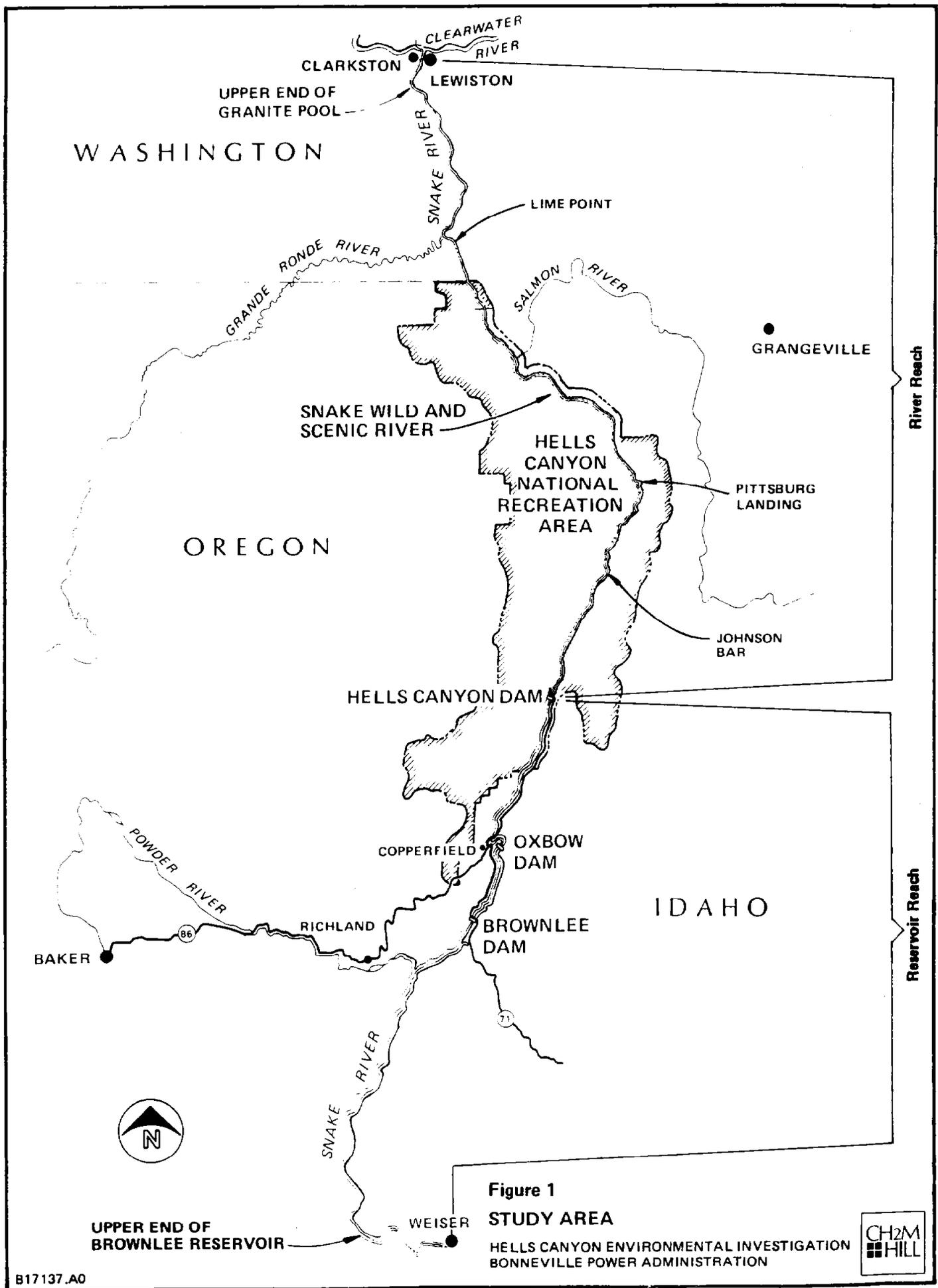
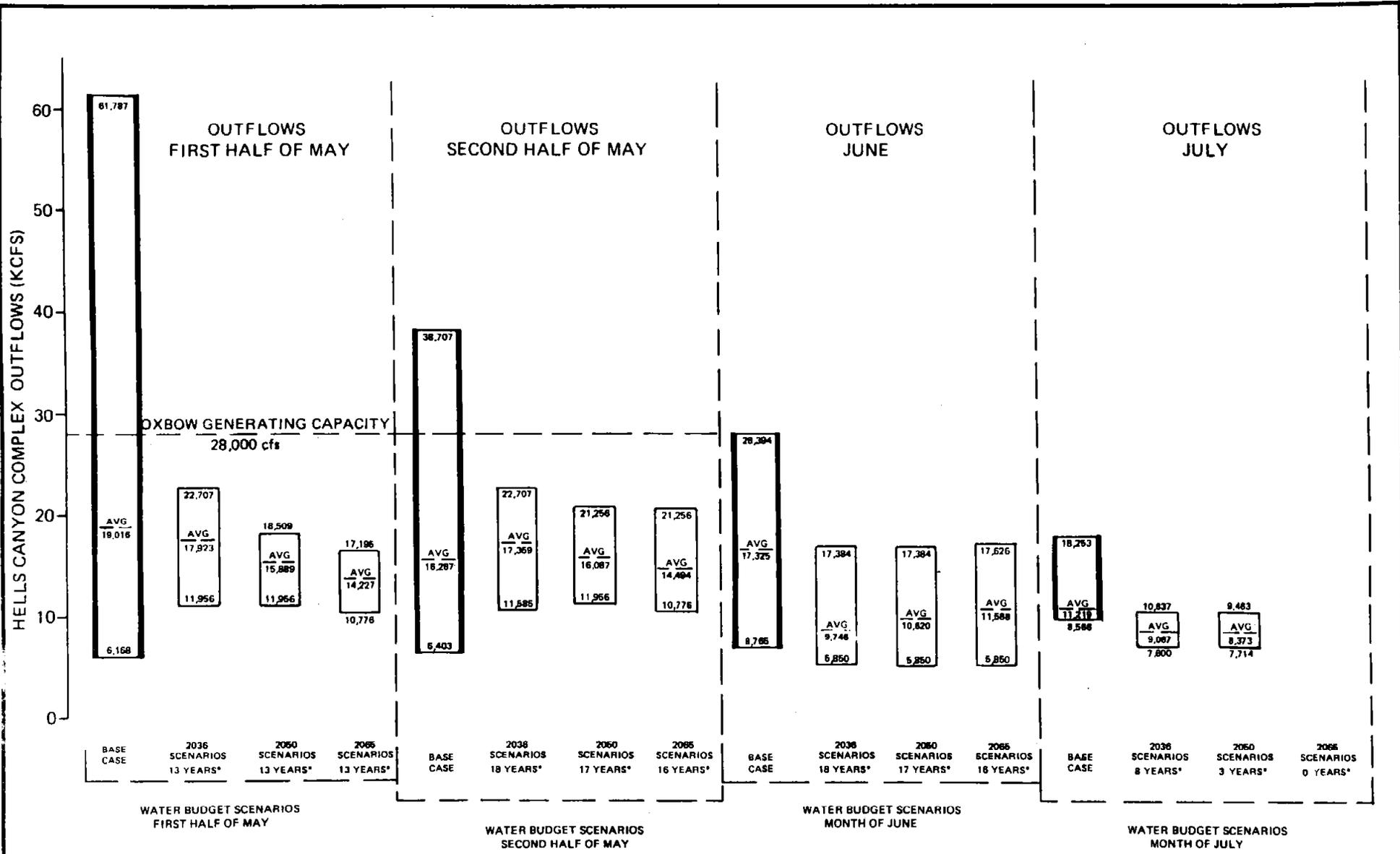


Figure 1
STUDY AREA

HELLS CANYON ENVIRONMENTAL INVESTIGATION
BONNEVILLE POWER ADMINISTRATION





* NUMBER OF YEARS OUT OF THE 40 YEAR HISTORICAL RECORD THAT OUTFLOWS WERE ADJUSTED TO MEET THE WATER BUDGET.

Figure 2
WATER BUDGET OUTFLOWS FROM THE HELLS CANYON DAM

HELLS CANYON ENVIRONMENTAL INVESTIGATION
BONNEVILLE POWER ADMINISTRATION



runoff when the Water Budget is most likely to be implemented, flows below Hells Canyon Dam would be higher during May and lower in June and July than under current conditions.

IPCo has stated it will not voluntarily spill water over the dam--that is, not exceed powerhouse generating capability--at any of its Hells Canyon plants for purposes of satisfying the Water Budget. IPCo will not spill water beyond the maximum generating capability of 28,000 cubic feet per second (cfs) because they do not want to lose the ability to generate power to meet loads. Because of IPCo's limitation, effects attributable to the Water Budget will occur only when flows below Hells Canyon Dam are at or below those at Oxbow. Oxbow has the smallest generating capacity of the three Hells Canyon plants, 28,000 cfs. Therefore, any flows above 28,000 cfs and any related environmental effects are not due to providing Water Budget flows.

Furthermore, in the analysis, the highest Water Budget flows provided by the Hells Canyon Complex never exceeded 22,707 cfs (or for simplicity, 23,000), well below the 28,000 cfs limitation imposed by IPCo.

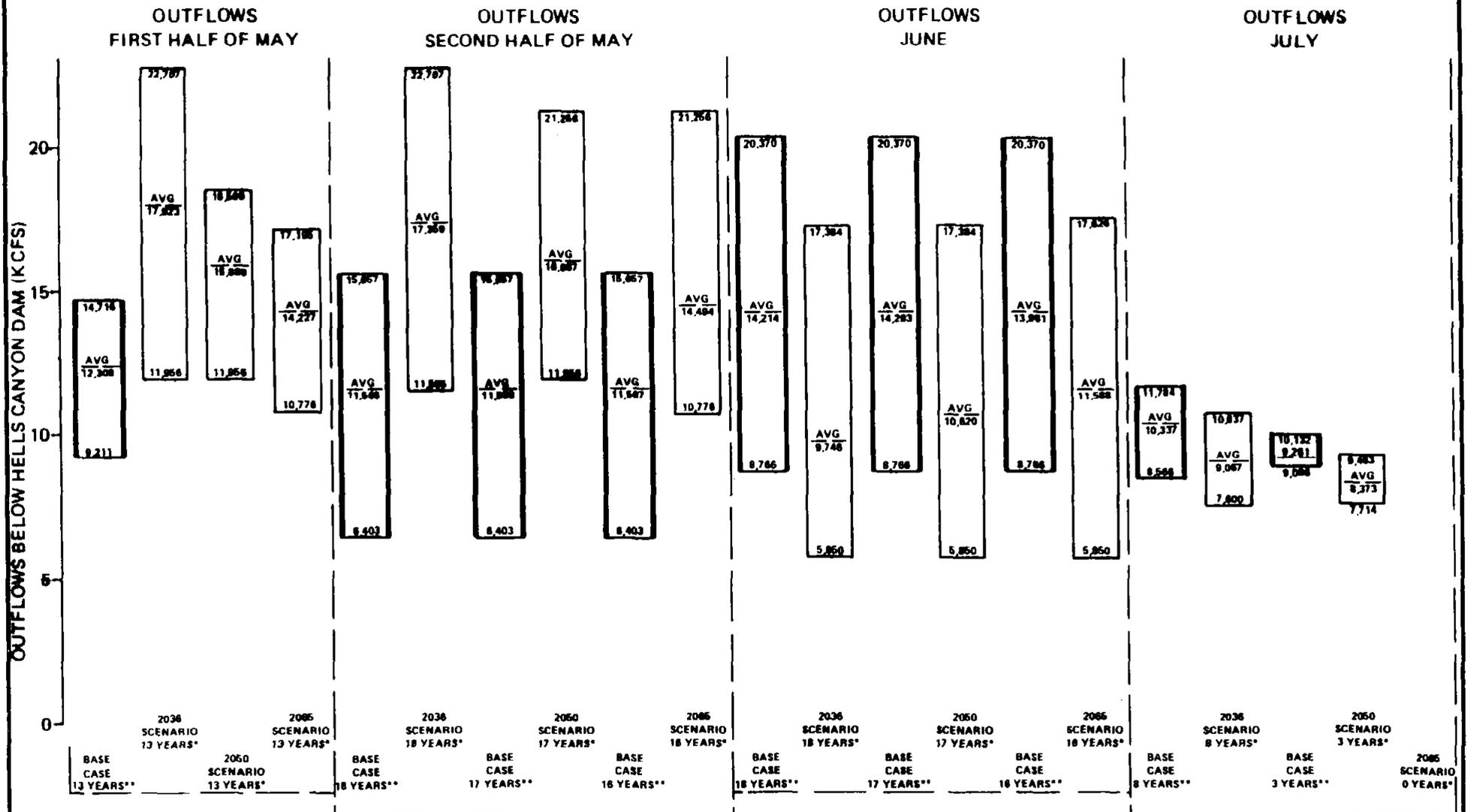
Based on information from the EI, Figure 2 shows the range of flows that may be expected under the Water Budget scenarios during the months of May, June, and July, and compares them to flows which would occur without the Water Budget for the same months in the 40-year study period (1928-1968). Flow ranges for June and July reflect the reduced river flows needed to assure reservoir refill by the end of July in those years when the Water Budget was needed.

Figure 3 takes Figure 2 one step further by comparing "adjusted" base case flows from the study period to each Water Budget scenario. The adjusted base case represents only those years comparable to the years in which Water Budget releases might occur rather than summarizing the whole 40-year study period. For example, in the first half of May, the base case flows have been adjusted to show the minimum, maximum, and average flows for those 13 years when Water Budget flows are provided. This adjusted base case is then compared to each Water Budget scenario (2036 ft., 2050 ft., and 2065 ft.) to provide a clearer understanding of what the differences could be.

In order to clarify the relationship between volumes of water (cfs) to shoreline elevation, Figure 4 shows the level of water resulting from various flows at Pittsburg Landing on the Snake River. This figure is meant only to illustrate flow and elevation levels, and is based on boater observations, not on actual measurements.

PRESENT CONDITIONS AND POTENTIAL CHANGES

The Hells Canyon Complex stores water to generate electricity and provides reservoir storage space for irrigation, navigation, recreation, and flood control. The reservoir system, Brownlee specifically, is usually drawn down by March 1 for flood control to assure adequate space to contain the spring runoff from Snake River Basin snowmelt. The lowest March 1 flood control for Brownlee elevation is about 2034 feet, and if necessary, the reservoir is drafted further during March, April, and May or until such time that the Corps permits IPCo to begin storing water. This results in high river flows and low reservoir elevations in early spring, with lower river flows in June as the reservoirs refill for energy, irrigation, navigation, and recreation storage.



*NUMBER OF YEARS OUT OF THE 40 YEAR HISTORICAL RECORD THAT OUTFLOWS WERE ADJUSTED TO MEET THE WATER BUDGET.

**ADJUSTED BASE CASE FOR THOSE YEARS WHEN WATER BUDGET IS PROVIDED.

Figure 3

**WATER BUDGET OUTFLOWS SHOWING
ADJUSTED BASE CASE**

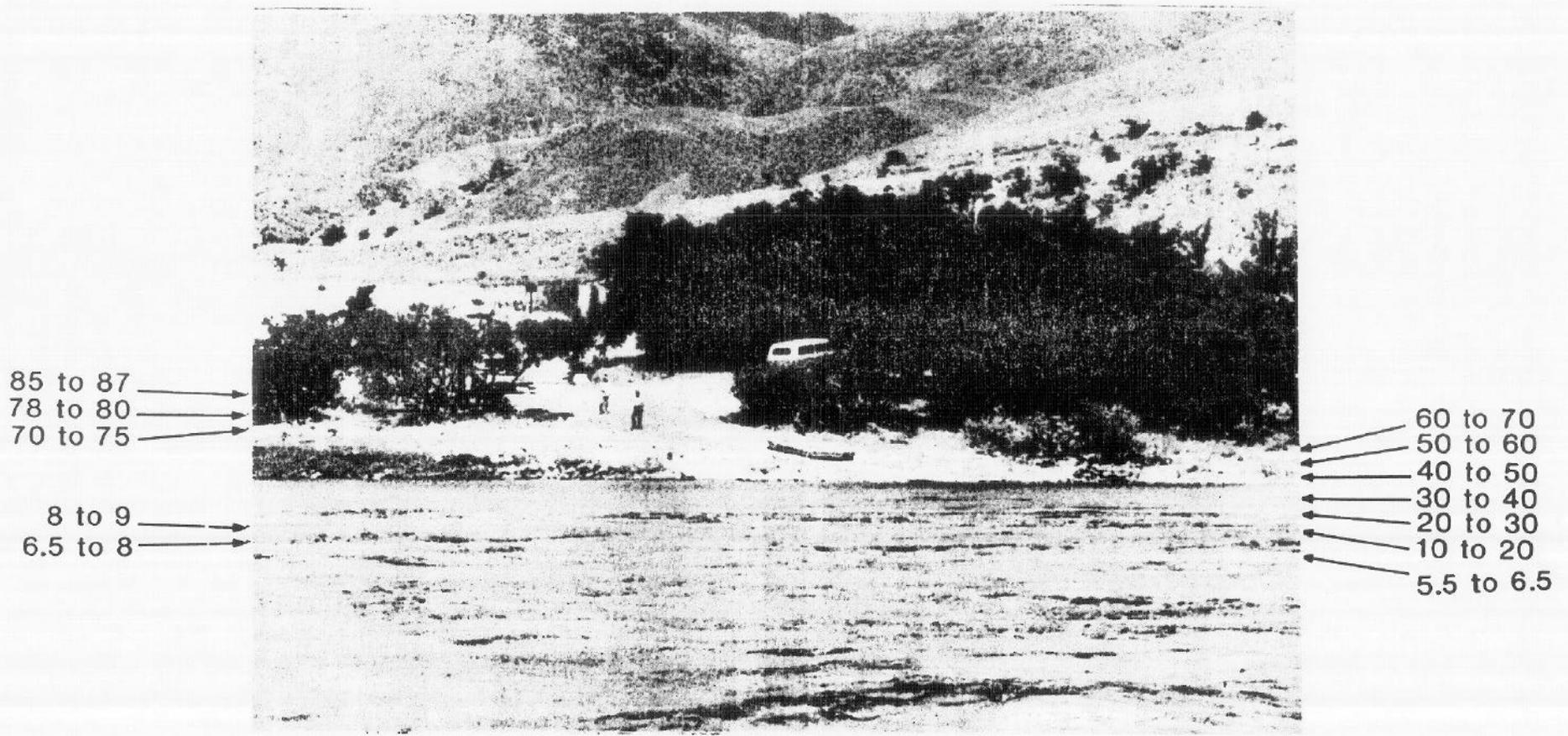
HELLS CANYON ENVIRONMENTAL INVESTIGATION
BONNEVILLE POWER ADMINISTRATION



FIGURE 4

**APPROXIMATE WATER ELEVATIONS AT PITTSBURG LANDING
AS RELATED TO VOLUMES OF WATER (IN THOUSANDS OF CFS)**

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The following sections summarize the present conditions in the study area, and identify changes that may take place when Water Budget flows are provided. Those identified changes occur only during periods when Water Budget flows occur. As shown in Figure 2 in the preceding section, the studies demonstrated that Water Budget flows would be called for a maximum of only 18 years out of the 40-year study period.

NATURAL FEATURES, WATER USE, AND AIR AND WATER QUALITY

Natural Features

West of Weiser, Idaho, the Snake River emerges from the Snake River plain and flows through a deep canyon eroded into the Blue Mountains of Oregon and the Seven Devils Mountains of Idaho. From Weiser to Oxbow Dam, the canyon is 2,000 to 3,000 feet deep. A few miles downstream from Oxbow, the river enters the narrow, steep-sided Hells Canyon, and flows from Hells Canyon onto a lava-filled basin through a much shallower canyon to Lewiston.

Most of the canyon slopes between Farewell Bend and Oxbow Dam are soil covered and several large landslide deposits exist. Most of those landslide deposits are old. However, there are several large active landslides in the study area: three near Huntington, Oregon; one upstream of Brownlee Dam; and one near the Powder River.

Although there are numerous mineral deposits scattered throughout the study area, mining activities are limited to two mines: one on the Hells Canyon Reservoir and one on the Brownlee Reservoir. Neither is influenced by reservoir levels.

Providing for the Water Budget might increase the potential for landslides in susceptible areas around Brownlee Reservoir. This is due to changes in the length of time that the reservoir may be at a certain elevation. Net erosion may also increase in the river channel and along less stable river banks because of low-to-moderate flows (below 23,000 cfs) for a longer period of time. There is a potential for river flows up to 28,000 cfs for very brief periods, but with no apparent or additional change in impacts.

Water Use and Quality

The primary water uses are hydropower generation, recreation, aquatic life support, irrigation, and navigation activities.

Hells Canyon Complex provides for travel, communication (mail delivery), and recreational activities. To aid mail delivery on the Snake River, IPCo releases 8400 cfs 2 times a week for 15 hours during low flow periods. In addition to navigation activities, approximately 1857 acres of the study area are irrigated; 12 irrigation withdrawals are downstream of Brownlee and 17 upstream.

Information available on sediment indicates no significant erosion in the river reach from Hells Canyon to Pittsburg Landing for current flows ranging from 5000 to 27,000 cfs. Water Budget flows may increase net downstream erosion due to the low-to-moderate flows (below 23,000 cfs) during May. Flow at those levels for a longer period of time would prolong any downstream erosion.

Providing Water Budget flows may slightly affect irrigation pump operations during times of lower than usual reservoir levels, probably early in the irrigation season (June and July). Based on the 40-year study period, lower reservoir elevations are expected to occur 0 to 20 percent more often, and will be more pronounced under the 2036 scenario than under the 2050 scenario. They will not occur under the 2065 scenario.

Brownlee Reservoir has water quality problems, particularly during late summer months. Under the Water Budget scenarios, there is a potential for slight changes in reservoir temperatures due to lower pool elevations in Brownlee. However, no change in compliance with State water quality standards is expected to result. There is no evidence that increased spring flow releases from Brownlee Reservoir will result in measurable variations to downstream river water temperature.

Air Quality

There are no major communities or industries in or immediately adjacent to the study area. Sources of air pollution within the area are primarily agriculture, residential heating (wood stoves), and motorized vehicles. No change to air quality is expected in the study area under any of the Water Budget scenarios.

FISH, WILDLIFE, AND VEGETATION

Fish

The Snake River fishery includes anadromous (below Hells Canyon Dam) and resident salmonids, and White Sturgeon; warm water sport fish (black crappie, smallmouth bass, and channel catfish); and rough fish (suckers, carp, squawfish, etc.). Rough fish have capitalized on the Brownlee habitat, and carp and sucker populations are high. Smallmouth bass, black crappie, and channel catfish are the primary sport fish in Brownlee.

Below the Hells Canyon Dam, the Snake River is rich in aquatic life. Snake River tributary creeks are clear, with good streamside cover and little streambank instability, and salmonid spawning and rearing habitat is not inhibited by low Snake River flows.

The characteristics of Brownlee Reservoir are: a high-quality smallmouth bass fishery; high rates of sediment deposition; thermal stratification (layers of warm and cool water in late summer); and a nutrient-rich environment. In contrast, the Oxbow and Hells Canyon reservoirs are transitional, between a riverine and reservoir system, rather than lake-like.

Populations of smallmouth bass come primarily from spawning within the reservoir. Spawning typically occurs in May and June at depths of 1 to 15 feet and is usually confined to tributary inflow areas, gravel banks, or at the edges of islands where relatively silt-free gravel occurs. Spring spawning coincides with high reservoir levels when shallow gravel areas are most likely to be inundated.

None of the Water Budget flow scenarios are expected to affect sport fishing in the Snake River. Under existing conditions, the minimum flows of 12,000 cfs considered optimum for salmonid reproduction in May and June are met from 64 to 90 percent of the time. Each Water Budget flow scenario in May is equal to or greater than this condition. Water Budget flows in May could improve survival of downstream migrating steelhead and fall chinook juveniles. However, since June flows will be reduced below existing levels, some impacts may result to game fish reproduction and migration. For example, in the 2036 scenario the flows in June would be less than 6000 cfs in 7 of the 18 years in which there are Water Budget releases from Brownlee Reservoir, or 20 percent of all years in the 40-year study period, and 12.5 percent of all years in the 2050 scenario. In those years when flows fall below 6000 cfs, fish mortality due to stranding could become a problem. It is not known if the May benefits will outweigh the June impacts.

As discussed on page 13, Brownlee Reservoir drawdowns due to Water Budget releases may result in slight variations in water temperatures because of somewhat shallower depths. However, impacts to game fish are not expected from any temperature changes in the reservoir.

Limited observations of the smallmouth bass population in Brownlee Reservoir under existing operations do not provide a proper test of potential effects of Water Budget on smallmouth bass spawning. During past observation periods, reservoir conditions were not comparable to what might occur under Water Budget. A potential exists to impact smallmouth bass spawning in Brownlee Reservoir due to Water Budget. However, insufficient data are available to assess the magnitude and frequency of possible effects.

It is anticipated that fish food organisms and fish productivity that occur in the reservoir will be unaffected by changes in reservoir elevations from April through June.

Vegetation

The predominant vegetation type below the Hells Canyon Dam is Douglas hackberry, with blue elderberry occurring in communities near the dam.

Along Brownlee Reservoir, vegetation varies considerably depending on the slope of the canyon and the length of time water is present. The predominant vegetation type is big sagebrush/bluebunch wheatgrass. The less prominent types are shrub willow type, Douglas hackberry, and antelope bitterbrush.

It is unlikely that the changes associated with the Water Budget flows will affect the willow-dominated scrub/shrub wetlands along the Snake River, below Hells Canyon Dam. Along Brownlee Reservoir, impacts to shoreline vegetation are difficult to assess since a measured drop in elevation at the dams does not always produce a similar drop at the reservoir's perimeter due to varied slopes. The lower reservoir levels that may be expected under any of the three Water Budget scenarios and the resulting impacts to shoreline vegetation are expected to be minor.

Wildlife

At least 30 species of waterfowl use the study reach of the Snake River during the year. The Canada goose is the most numerous nester, with most nesting

activity occurring above Brownlee Dam, particularly on islands at the upper end of the reservoir. The number of Canada goose pairs nesting on these islands represents 20 to 25 percent of the number of known nesting pairs on the Snake River from Walter's Ferry to Farewell Bend.

It is unlikely that providing Water Budget flows will affect wildlife along the Snake River below the Hells Canyon Dam. The Water Budget scenarios would alter the timing of future flow fluctuations in the study area compared to those which have historically occurred, but the total magnitude of fluctuation is not expected to be greater than what has occurred historically. Although wildlife habitat has adapted to past fluctuating water levels, small amounts of riparian and emergent wetlands may be affected by Water Budget releases. No upland wildlife habitat (i.e., grass, shrub, or forested areas) is expected to be affected.

The greatest potential impact to wildlife involves Canada geese and waterfowl which nest on islands in the upper 10 miles of Brownlee Reservoir.

Implementation of any of the Water Budget scenarios would decrease the percentage of years in which the elevation of Brownlee Reservoir would be high enough to protect island-nesting Canada geese from predators. At a reservoir elevation of 2050 feet or less, all the major nesting islands are upstream of reservoir slack water. Canada geese nesting on these islands would be affected more often than those nesting on the few islands lying farther downstream, or those on the river bank or on cliffs. The highest potential for impact to island-nesting Canada geese occurs with the 2036 scenario. Conversely, the 2065 scenario would have the least impact of the three Water Budget scenarios.

HISTORICAL AND ARCHAEOLOGICAL RESOURCES

Historical and archaeological resources in the Snake River Canyon are considered pristine. They are significant in defining and understanding the cultural history of the Northwest since the region's prehistory extends back in time to well over 8000 years. There are a total of 751 identified archaeological sites below Hells Canyon Dam, and 23 in the reservoir system.

Below Hells Canyon Dam, there are presently 11 archaeological sites in the Hells Canyon National Recreation Area identified as being affected by erosion. Photographs of selected beaches in the canyon taken in October 1973 reveal substantial beach loss when compared to present-day conditions. Although studies have not focused on river elevations or flows at which these impacts occur, erosion caused by the Water Budget can take place only when flows are below 28,000 cfs.

Existing impacts to sites in Brownlee reservoir have not been specifically assessed. During low water elevations, vandalism and erosion due to water fluctuation and wave cutting are thought to affect prehistoric sites. Biochemical and mechanical (induced by human or animal) actions also affect archaeological sites, resulting in the potential loss of the site and degradation of archaeological data.

Limited or poor information on archaeological resources in the reservoir system and downstream makes a comprehensive evaluation of Water Budget effects on cultural resources impossible at this time.

It is not known if any erosion occurs when flows are less than 23,000 cfs. To the extent it does, Water Budget flows during the month of May below Hells Canyon Dam may increase erosion slightly. (Changes in flows under the Water Budget scenarios for May are shown in Figure 2.) Under all three Water Budget scenarios, no adverse erosion changes will occur in June and July since flows will be below existing conditions.

Because of an increase in the duration of lower reservoir elevations, increases in impacts caused by humans and animals within the existing zone of operations may occur in Brownlee Reservoir. The potential for mechanical impacts to as yet unidentified sites is greater for the 2036 scenario than under the base conditions or under the 2050 and 2065 conditions.

LAND USE, RECREATION, AND AESTHETICS

Land Use

Land uses within the study river corridor are recreation, livestock ranching, wildlife forage production, and residential development. Impacts to existing land uses are not expected under any of the Water Budget scenarios considered.

Recreation

The Snake River and its reservoirs are a major recreational resource. Swimming, picnicking, camping, hunting, boating (float and power), and fishing are popular activities in the river corridor. Other significant recreation activities are hiking and sightseeing.

The reservoir system of the study area is lake-like, with broad areas of slow moving water. Access to the water and the water-based recreation sites in the reservoirs is considerably easier than in the downstream reaches. Due to these characteristics, the three reservoirs offer motor boating, water skiing, still or troll fishing, RV camping, and other social opportunities in contrast to the wilderness, pristine, white water, and isolation opportunities below Hells Canyon Dam.

Implementation of the Water Budget scenarios would affect those recreation facilities in Brownlee Reservoir located above 2034 feet in May and June. Recreation use of the reservoir is high in May, with less use during June and July. Below Hells Canyon Dam, recreational use is highest in June and July. Water Budget flows, if implemented, will coincide with the recreational high-use periods for Brownlee Reservoir during May, and below Hells Canyon Dam during June and July. Table 1 summarizes the anticipated impacts to existing recreation facilities as the result of Water Budget releases.

Aesthetics

The Hells Canyon is the deepest gorge in North America and has long been recognized as an area of exceptional scenic and recreational value. The upper 31 miles of the river is a designated National Wild River and the lower 36.5 miles is a designated National Scenic River.

Anticipated impacts to aesthetic resources resulting from Water Budget releases are summarized in Table 2.

Table 1

SUMMARY OF RECREATION IMPACTS ^{a/}

<u>Impact Reach</u>	<u>Base Conditions</u>	<u>Floor At 2036 Feet b/</u>	<u>Floor At 2050 Feet b/</u>	<u>Floor At 2065 Feet b/</u>
BROWNLEE May - First Half	Very poor at Hewett and Farewell Bend.	Aggravation of existing poor conditions at Hewett, Farewell Bend, and Steck and on boating/skiing.	Aggravation of existing poor conditions at Hewett.	Aggravation of existing poor conditions at Hewett, Farewell Bend, and Steck and on boating/skiing.
	Moderately poor at Steck, Spring, and Woodhead.	Aggravation of existing poor conditions at Steck.	Aggravation of existing poor conditions at Farewell Bend and Steck and on boating/skiing.	NO CHANGE on Spring and Woodhead ramps.
May - Second Half	Moderately poor conditions at all parks.	NO CHANGE on Spring and Woodhead ramps.	NO CHANGE on Spring and Woodhead ramps.	Aggravation of poor conditions at Hewett and Farewell Bend and on boating/skiing.
		Aggravation of existing poor conditions at Hewett and Farewell Bend and on boating/skiing.	Aggravation of existing poor conditions at Hewett and Farewell Bend and on boating/skiing.	
June	Good conditions at all parks except for moderately poor conditions at some Hewett Park facilities.	NO CHANGE at Spring and Woodhead.	Aggravation of existing poor conditions at Steck.	NO CHANGE.
		Adverse impact at Hewett and Farewell Bend and on boating/skiing.	No change at Spring and Woodhead.	
		Adverse impact at Steck.	Adverse impact at Hewett, Farewell Bend, and Steck and on boating/skiing.	
July	Very poor at Hewett and Farewell Bend. Moderately poor at Steck. Good conditions at Spring and Woodhead.	NO CHANGE at Spring and Woodhead.	NO CHANGE at Spring and Woodhead.	NO CHANGE.
		NO CHANGE.	NO CHANGE.	

Table 1 (continued)

SUMMARY OF RECREATION IMPACTS ^{a/}

<u>Impact Reach</u>	<u>Base Conditions</u>	<u>Floor At 2036 Feet b/</u>	<u>Floor At 2050 Feet b/</u>	<u>Floor At 2065 Feet b/</u>
RIVER SEGMENT				
May - First Half	Moderately poor for float and power boating.	Beneficial impact on power boating and Pittsburg Landing ramp (2 percent more availability for both). No change for float boating.	Same as 2036 scenario.	Same as 2036 scenario.
May - Second Half	Occasional poor conditions for float and power boating.	Beneficial impact on float and power boating and Pittsburg Landing ramp (5, 5, and 7 percent more availability).	Same as 2036 scenario.	Same as 2036 scenario.
June	Good conditions.	Adverse impact on float and power boating and on Pittsburg Landing ramp (16, 16, and 18 percent less availability).	Adverse impact on float and power boating and on Pittsburg Landing ramp (12, 10, and 13 percent less availability).	Adverse impact on float boating, power boating, and Pittsburg Landing ramp (4, 4, and 8 percent less availability).
July	Good conditions except for occasional problems at Pittsburg Landing ramp.	Adverse impacts on float and power boating and on Pittsburg Landing ramp (3, 3, and 7 percent less availability).	Adverse impact on float and power boating and on Pittsburg Landing (3, 3, and 2 percent less availability).	NO CHANGE.

^{a/} Based on the total 40-year period of record.

^{b/} Change from base conditions.

Table 2

SUMMARY OF AESTHETIC IMPACTS a/

Impact Beach	Existing Conditions b/	Floor At 2036 Feet c/	Floor At 2050 Feet c/	Floor At 2065 Feet c/
BROWNLEE				
May - First Half	Stumps exposed 51 percent of the time and mud flats exposed 55 percent of the time.	Increase in time of exposure of logs (19 percent) and mud flats (18 percent).	Increase in time of exposure of logs (2 percent) and mud flats (4 percent).	Increase in time of exposure of stumps and logs (2 percent), but no change in the exposure of mud flats.
May - Second Half	Stumps and mud flats exposed 23 and 24 percent of the time, respectively.	Increase in time of exposure of logs (34 percent) and mud flats (33 percent).	Increase in time of exposure of stumps and logs (34 percent) and mud flats (33 percent).	Increase in time of exposure of stumps and logs (3 percent) and mud flats (30 percent).
June	Good visual quality. of logs (5 percent) and mud flats (11 percent).	Increase in time of exposure of stumps and logs (1 percent) and mud flats (6 percent).	Increase in time of exposure of stumps and logs (34 percent) and mud flats (6 percent).	NO CHANGE.
July	Stumps and mud flats exposed 42 and 51 percent of the time.	NO CHANGE.	NO CHANGE.	NO CHANGE.
RIVER SEGMENT				
May - First Half	White water appearance not present 26 percent of the time and algae exposed 17 percent of the time.	Beneficial changes - 2 percent increase in white water appearance and decrease in exposed algae (10 percent).	Same as 2036 scenario.	Same as 2036 scenario except exposed algae reduced 5 percent.
May - Second Half	White water appearance not present 18 percent of the time and algae exposed 34 percent of the time.	Beneficial changes - 5 percent increase in white water appearance and decrease in exposed algae (14 percent).	Same as 2036 scenario.	Same as 2036 scenario.
June	White water appearance not present 8 percent of the time and algae exposed 13 percent of the time.	Adverse changes-diminished white water (20 percent) and increase in exposed algae (13 percent).	Adverse changes-diminished white water (12 percent) and increase in exposed algae (9 percent).	Adverse changes-diminished white water (4 percent) and increase in exposed algae (8 percent).
July	Algae exposed 90 percent of the time.	Adverse changes-diminished white water (5 percent) and no change in exposed algae.	Adverse changes-diminished white water (3 percent) and no change in exposed algae.	NO CHANGE.

a/ Percentages are based on total 40-year period of record.

b/ Refers to percent of time white water effect is not present and percent of time logs, stumps, mud flats, and algal mats are present.

c/ Percent change from base conditions.

PUBLIC REVIEW PROCESS

The draft EI and an earlier version of this summary were sent to interested agencies and private individuals in early August 1984. A series of four public meetings and one agency meeting were also held:

Lewiston, Idaho - September 10, 1984

Baker, Oregon - September 11, 1984

Weiser, Idaho - September 12, 1984

Boise, Idaho (Public) - September 13, 1984

Boise, Idaho (Agency) - September 13, 1984

Each meeting began with a 5-minute slide presentation explaining why the investigation was being done. A short summary of the results of the study was then given and the meeting opened to comments. The meeting panel consisted of representatives from BPA and IPCo and was moderated by CH2M Hill, the project consultant. In addition to these meetings, written comments were solicited and received.

MEETING AND LETTER COMMENTS

A total of 29 people attended the five meetings, with 18 offering comments and questions. Detailed transcripts of each meeting and sign-up sheets are included in the Final EI. During the comment period, 14 letters were received. The letters and responses are also included in the Final EI. Following is a brief summary of comments made at the meetings and concerns expressed in letters.

The main concern of the attendees and commenters was effects on fish and wildlife, with most focusing on the smallmouth bass fishery. Statements were made in opposition to the Water Budget because of impacts to smallmouth bass, and comments were made in support of the Water Budget, saying that bass will not likely be affected by it. There was an extensive discussion of recent trends in bass populations in Brownlee Reservoir and results of bass studies conducted in other reservoirs. The adequacy of data and analyses of impacts to bass spawning and food resources in Brownlee Reservoir was questioned. It was felt that effects on migrating smolts should have been included. Other concerns expressed were lack of management of reservoir fishery, mitigation for loss of fishery, fish stranding, ramping rates, nitrogen supersaturation, water temperatures, and fishers' preferences.

The steelhead, trout, and salmon fisheries were also discussed. One comment was made that low flows in June will not likely affect their spawning, while another concerned negative effects and the need for additional studies.

With regards to wildlife, a Boise agency meeting attendee voiced disagreement with the concern expressed in the EI over goose production on islands in Brownlee Reservoir.

Another major concern was recreation, mainly boating. Questions were asked on boating and boat ramps in general, and specifically on the potential reduced use of the launch at Hewlett Park. The distribution of recreation use and recreation on Brownlee Reservoir was also questioned.

Timing was another important issue. Questions were raised on the use of May in Water Budget modeling and the time of Brownlee refill, increased duration of moderate flows in May, timing of Water Budget needs in relation to IPCo's willingness to provide the water, and frequency of Water Budget use.

There were issues of water contributions and water levels. Many questions were asked: the relative contributions of water from the Snake and Clearwater Rivers and the Galloway Project; high and low water limits below Hells Canyon Dam; and how frequently flow release limits will not meet Water Budget needs. The flexibility of drawdown level selection and its effect on the ability to meet Water Budget needs was discussed, as was daily fluctuations in relation to longer-term flow modifications below Hells Canyon Dam.

There were questions regarding forcing IPCo to implement the Water Budget and future schedule, benefits to IPCo if the Water Budget is implemented, and the nature of the potential agreement with BPA.

Several other concerns were brought up. For instance, Water Budget impacts on the local economy and possible decreased property values; many local landowners were worried about the effects of lowered reservoir on cattle containment and vandalism. Questions were asked and clarification requested on the beach erosion issue below Hells Canyon Dam. Specific points were made on statements in the technical report dealing with water quality. There was concern over future irrigation demands on the Snake River and increased irrigation costs and water rights. Potential impacts to archeological sites at Brownlee Reservoir and impacts to cultural resources were discussed. A question was asked regarding the maximum and minimum generating capacity at the Hells Canyon complex.